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AMERICAN COLLEGE of CARDIOLOGY

Vaccine-induced Thrombotic Thrombocytopenia (VITT) and COVID-19 Vaccines: What Cardiovascular Clinicians Need to Know

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Cardiology Magazine

Current Key Question on COVID-19 and Cardiovascular Disease

Organized in an FAQ format for easy navigation, this guidance is summarized from more extensive documents and approved by the ACC Science and Quality Committee. This FAQ is intended to be topical, not comprehensive.

Category: COVID Vaccination
Patient Type: COVID-19 Vaccinated
Prevalence: Extremely rare
Principal Guidance: *In extremely rare cases, the Johnson & Johnson/Jansen and Astra Zeneca COVID-19 vaccinations may cause vaccine-induced thrombotic thrombocytopenia (VITT), a condition characterized by simultaneous acute thrombosis and thrombocytopenia. The condition is similar to heparin-induced thrombocytopenia. Specific risk factors for VITT have yet to be determined given the extremely low case count, though presentation seems to appear between 5-28 days post vaccination. Patients should be reassured that the benefits of vaccination against COVID-19 far outweigh any potential risk. Diagnostic, therapeutic, and patient communication recommendations are included below.*

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What is VITT and how common is it?

Vaccine-inducted thrombotic thrombocytopenia (VITT) has also been referred to as vaccine-induced prothrombotic immune thrombocytopenia (VIPIT) or thrombosis with thrombocytopenia syndrome (TTS). This condition is similar to heparin-induced thrombocytopenia (HIT) but is associated with prior administration of the Johnson & Johnson/Janssen or AstraZeneca COVID-19 vaccines ***without*** prior exposure to heparin. To date (June 8, 2021), this condition has not been reported in patients who have received the Moderna or Pfizer COVID-19 vaccines.

VITT is characterized by the presence of two conditions concurrently: thrombosis (often in unusual sites like the cerebral veins or splanchnic veins) AND thrombocytopenia. Early mechanistic evaluations have identified antibodies directed against the platelet factor 4 (PF4)-heparin complex which activate platelets, similar to HIT antibodies. Detection of the PF4 antibodies can be done using a HIT ELISA test, but not reliably with other HIT laboratory tests.

The incidence of VITT is not certain, but it appears to be extremely rare. A recent report in JACC found that cerebral vein thrombosis occurred in 3.6 per million people after the AstraZeneca COVID-19 vaccine and 0.9 per million people after Johnson & Johnson vaccine. For comparison, the rate of cerebral vein thrombosis is estimated at 207 per million in patients hospitalized with COVID-19 and 2.4 per million in the general population. The risk of death and serious outcomes of COVID-19 (including thrombosis) far outweigh the small risk of VITT.

Who is at risk for VITT?

Early data suggest that VITT occurs only following a COVID-19 vaccination with Johnson & Johnson or AstraZeneca vaccine. Note that AstraZeneca vaccine is NOT available in the United States. Furthermore, the small number of reported events occurred between 5-42 days following the vaccine. They have not been reported to occur immediately (within 1-2 days) or longer-term (beyond 6 weeks) after vaccination. It will be important to re-evaluate the "at risk" window as more is learned about VITT.

the cases following Johnson & Johnson vaccine in the United States occurred in women, both men and women have been diagnosed with VITT following AstraZeneca vaccine in other parts of the world.

There is no evidence that patients with a history of thrombosis, thrombophilia, or prior HIT are at increased risk for VITT.

What should I do if I suspect a case of VITT?

The first thing to do for a suspected case of VITT is to verify COVID-19 vaccine details – which vaccine and when was it administered? Only patients who have received Johnson & Johnson or AstraZeneca vaccine 5-42 days previous to symptoms onset are at risk based on current information.

Next, imaging appropriate to their symptoms (e.g., CT or MR venogram of the head for suspected cerebral vein thrombosis) and urgent complete blood count (including platelet count) are appropriate. If either test is normal (no thrombosis or thrombocytopenia), then VITT is highly unlikely. A markedly elevated D-dimer test can also be suggestive of early VITT in the setting of low/normal platelet levels. If BOTH imaging and laboratory tests are abnormal (acute thrombosis and thrombocytopenia), hospitalization for further evaluation and treatment guided by a hematologist or other thrombosis expert is appropriate.

What should I tell my patients who call with questions about VITT and COVID-19 vaccines?

First, provide reassurance that these events are extremely rare. In the rare event that VITT occurs, hospitals and doctors have the tools to diagnose and treat this condition.

Second, remind them that VITT has only been seen with the Johnson & Johnson and AstraZeneca COVID-19 vaccines. Note that AstraZeneca's vaccine is not available in the United States and the Johnson & Johnson vaccine program has been placed on hold. Furthermore, VITT has not been reported in patients who received the Moderna or Pfizer vaccines. Overall, the available COVID-19 vaccines are very safe and highly effective at preventing COVID-19 infection. All patients should be encouraged to get vaccinated against COVID-19 as soon as possible given the ongoing pandemic and known risks of COVID-19 infection. Finally, the apparent risk of VITT with a COVID-19 vaccine is greatly outweighed by the risk of

complications from COVID-19 infection (including hospitalization, thrombosis and death).

Third, if a patient did receive the Johnson & Johnson vaccine, the presumed window of risk is narrow – between 5 and 42 days after vaccination. Based on our initial understanding of this condition, patients outside that window can be further reassured.

Finally, use of any medication to prevent VITT (e.g., aspirin) is not recommended. These events are extremely rare and there is no evidence that any medication would prevent them from occurring.

Where can I get more information?

- **CDC website**
- **ASH website**
- **ISTH website**

Published References

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Keywords: *ACC Publications, Cardiology Magazine, COVID-19, Coronavirus, Coronavirus Infections, Acute Coronary Syndrome, Anticoagulants, Arrhythmias, Cardiac, Cardiac Surgical Procedures, Metabolic Syndrome, Angina, Stable, Heart Defects, Congenital, Dyslipidemias, Geriatrics, Heart Failure, Angiography, Diagnostic Imaging, Pericarditis, Secondary Prevention, Hypertension, Pulmonary, Sleep Apnea Syndromes, Sports, Exercise Test, Heart Valve Diseases, Aneurysm*